GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

COURSE CURRICULUM
COURSE TITLE: MOBILE COMPUTING AND APPLICATION DEVELOPMENT
(COURSE CODE: 3360704)

Diploma Program in which this course is offered	Semester in which offered
Computer Engineering	Sixth

1. RATIONALE

The use of mobile communication and android based applications are increasing day by day. It is therefore necessary for students to know that how mobile communication works and how to build mobile apps for android operating system. This course covers the necessary concepts which are required to understand mobile communication and to develop Android Applications. Thus it is key course for computer engineers, who want to work in the area of communication.

2. COMPETENCIES

The course content should be taught and implemented with the aim to develop required skills in the students so that they are able to acquire following competencies:

- **Explain functioning of different mobile communication technologies such as GSM and CDMA**
- **Explain development process of open source mobile application**

3. COURSE OUTCOMES (COs) :

The theory should be taught and practical should be carried out in such a manner that students are able to acquire different learning out comes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.

- Explain functioning of different mobile technology
- Demonstrate Android activities life cycle
- Execute operations on GUI objects
- Perform Event driven programming
- Apply various techniques on working with menu

4. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	ESE	PA	ESE	PA	200
3	0	4	7	70	30	40	60	

Legends: L - Lecture; **T -** Tutorial/Teacher Guided Student Activity; **P -** Practical; **C** -Credit; **ESE** - End Semester Examination; **PA** - Progressive Assessment

5. COURSE CONTENT DETAILS

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
Unit – I **Introduction to Mobile Computing**	1a.Explain brief Introduction to Mobile technology and generations 1b.Define and explain characteristics of GSM and CDMA 1c. Explain services and architecture of GSM AND Mobile Computing 1d. Explain characteristics , Application & Security issue of Mobile Computing 1c. Explain Middleware and Gateway for Mobile Computing 1d. Explain Mobile IP and mobile Communication Protocol 1e. Introduction to Mobile computing through telephony	1.1 Concept of Mobile Communication 1.2 Different generations of wireless technology 1.3 Basics of cell, cluster and frequency reuse concept 1.4 Noise and its effects on mobile 1.5 Understanding GSM and CDMA 1.6 Basics of GSM architecture and services like voice call, SMS, MMS, LBS, VAS 1.7 Different modes used for Mobile Communication 1.8 Architecture of Mobile Computing(3 tier) 1.9 Design considerations for mobile computing 1.10 Characteristics of Mobile Communication 1.11 Application of Mobile Communication 1.12 Security Concern Related to Mobile Computing 1.13 Middleware and Gateway required for mobile Computing 1.15 Making Existing Application Mobile Enable 1.16 Mobile IP 1.17 Basic Mobile Computing Protocol 1.18 Mobile Communication via Satellite • Low orbit satellite • Medium orbit satellite • Geo stationary satellite Satellite phones
Unit – II **Introduction to Android**	2a. Analyze Open source mobile technology, Explain Basics of Application development 2b. Explain Framework, SDK, Emulation 2c. Explain Android Application structure	2.1 Overview of Android 2.2 What does Android run On – Android Internals? 2.3 Android for mobile apps development 2.5 Environment setup for Android apps Development 2.6 Framework - Android- SDK, Eclipse 2.7 Emulators – What is an Emulator / Android AVD?

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
		2.8 Android Emulation – Creation and set up 2.9 First Android Application
Unit – III **Android Activities and GUI Design Concepts**	3a. Explain Android Activities lifecycle and UI Layout 3b. Explain Expressions, Manifest, other necessary UI concept	3.1 Design criteria for Android Application : Hardware Design Consideration, Design Demands For Android application, Intent**,** Activity, Activity Lifecycle and Manifest 3.2 Creating Application and new Activities 3.3 Simple UI -Layouts and Layout properties :Introduction to Android UI Design, Introducing Layouts
	3c.List and explain GUI Objects, 3d. Explain Layout Design concepts	3.5 XML Introduction to GUI objects viz.: Push Button , Text / Labels , EditText, ToggleButton , Padding
Unit – IV **Advanced UI Programming**	4a. Explain Android Event driven Programming, Activity Lifecycle, Explain Exception handling	4.1 Event driven Programming in Android (Text Edit, Button clicked etc.) 4.2 Activity Lifecycle of Android
Unit – V **Toast, Menu, Dialog, List and Adapters**	5a.Demonstrate working with menu and dialog, Themes, Dialog 5b.Perform Demo Application Launching 5c Perform Database operation	5.1 Menu :Basics, Custom v/s System Menus, Create and Use Handset menu Button (Hardware) 5.2 Dialog : Creating and Altering Dialogs 5.3 Toast : List & Adapters 5.4 Demo Application Development and Launching 5.5 Basic operation of SQLite Database 5.6 Android Application Priorities

6. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Introduction to Mobile Computing	14	10	10	2	22
II	Introduction to Android	6	2	6	2	10
III	Android Activities and GUI Design concepts.	8	2	4	8	14
IV	Advanced UI Programming	6	2	2	6	10
V	Toast, Menu, Dialog, List and Adapters	8	2	6	6	14
	Total	**42**	**18**	**28**	**24**	**70**

Legends: R = Remember; U = Understand; A = Apply and above levels (Bloom's revised taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

7. SUGGESTED LIST OF EXERCISES/PRACTICAL

The practical/exercises should be properly designed and implemented with an attempt to develop different types of skills **(outcomes in psychomotor and affective domain)** so that students are able to acquire the competencies/programme outcomes. Following is the list of practical exercises for guidance.

***Note**: Here only outcomes in psychomotor domain are listed as practical/exercises. However, if these practical/exercises are completed appropriately, they would also lead to development of certain outcomes in affective domain which would in turn lead to development of **Course Outcomes** related to affective domain. Thus over all development of **Programme Outcomes (**as given in a common list at the beginning of curriculum document for this programme) would be assured.*
Faculty should refer to that common list and should ensure that students also acquire outcomes in affective domain which are required for overall achievement of Programme Outcomes/Course Outcomes.

Sr. No.	Unit No.	Practical Exercises	Hrs. Required
1	II	Installation and setup of java development kit(JDK),setup android SDK,setup eclipse IDE,setup android development tools (ADT) plugins,create android virtual device	4
2	II	Create "Hello World" application. That will display "Hello World" in the middle of the screen using TextView Widget in the red color	4
3	III	Create application for demonstration of android activity life cycle	2
4	III	Create Registration page to demonstration of Basic widgets available in android.	4
5	III	Create sample application with login module.(Check username and password) On successful login, Chnage TextView "Login Sucessful". And on failing login, alert user using Toast "Login fail"	4
6	III	Create login application where you will have to validate usename and passwords Till the username and password is not validated , login button should remain disabled.	4
7	III	Create and Login application as above. Validate login data and display Error to user using setError() method.	4
8	III	Create an application for demonstration of Relative and Table Layout in android.	4
9	III	Create an application for demonstration of Scroll view in android	2
10	III	Create an application for demonstration of Explicitly Starting New Activity using Intent.	2
11	III	Create an application that will pass two number using TextView to the next screen , and on the next screen display sum of that number.	4
12	III	Create spinner with strings taken from resource folder(res >> value folder). On changing spinner value, change background of screen.	4

13	IV	Create an application that will get the Text Entered in Edit Text and display that Text using toast (Message).	4
14	IV	Create an application that will Demonstrate Button onClick() Event and change the TextView Color based on button Clicked	4
15	V	Create an UI such that, one screen have list of all the types of cars. On selecting of any car name, next screen should show Car details like: name, launched date, company name	4
16	V	Create an application that will Demonstrate Dialog Box Control In Android	4
	Total hour		**58**

8. SUGGESTED STUDENT ACTIVITIES

Following is the list of proposed student activities such as:

i. Design sample GUI

ii. Prepare and Present presentation on different mobile technology and on Open Source Technology

iii. Prepare comparison of technical features of different mobile communication Technologies being used by popular service providers (such as VSNL, Reliance, Vodafone, Idea etc.) in your city/town

9. SPECIAL INSTRUCTIONAL STRATEGIES (if any)

i. Faculty should demonstrate an Open source technology specifically java and should give some clear understanding of mobile technology using some simulation or pictorial representation.

ii. Concepts should be introduced in classroom input sessions and by giving demonstration through projector.

iii. More focus should be given on practical work which will be carried out in laboratory sessions. If possible some theory sessions may be conducted in labs so that theory and practice can go hand in hand.

iv. Group Discussion and presentation of related websites should be arranged.

v. Faculty should allow students to use their creativity and during practical sessions let them struggle to learn on their own. However, faculty should remain around the students and should help them when they are stuck.

10. SUGGESTED LEARNING RESOURCES

A) List of Books

Sr. No.	Title of Book	Author	Publication
1	Building Android Apps	IN EASY STEPS	McGraw-Hill Education
2	Professional Android 2 Application Development	Reto Meier	Wiley India Pvt Ltd
3	Beginning Android	Mark L Murphy	Wiley India Pvt Ltd
4	Pro Android	Sayed Y Hashimi and Satya Komatineni	Wiley India Pvt Ltd

Suggested Readings:

i. Android Studio Development Essentials by Neil Smyth
ii. The Definitive Guide to SQL Lite by Michael Owens

B) List of Major Equipment/ Instrument with Broad Specifications

i. **Hardware:** Necessary Kits or Environment to briefly introduce mobile technology environment like GSM, CDMA and GSM services, Computer with latest configuration
ii. **Software:** Java, Netbeans, Eclipse, Android SDK (open source)

C) Additional Resources of MIS that can be used for conducting Practical as well as case studies

i. http://www.tutorialspoint.com/android/
ii. http://www.tutorialspoint.com/android/android_overview.htm
iii. http://www.codelearn.org/android-tutorial/android-introduction
iv. http://pl.cs.jhu.edu/oose/resources/android/Android-Tutorial.pdf
v. http://mobisys.in/blog/2012/01/introduction-to-android-sqlite-database/
vi. www.appmakr.com/Android
vii. www.telerik.com/android-development
viii. developer.android.com/training/basics/firstapp

11. COURSE CURRICULUM DEVELOPMENT COMMITTEE

Faculty Members from Polytechnics

- **Prof. P. P. Kotak**, H. O. D Computer Department, A. V. P. T. I., Rajkot
- **Prof. R. M. Shaikh**, H.O.D Computer Department, K. D. Polytechnic, Patan
- **Prof. K. N. Raval**, H.O.D Computer Department, R. C. Technical Institute, Ahmedabad
- **Prof. S. R. Solanki**, Lectuer Computer, Government Polytechnic, Dahod
- **Prof. R. B. Pancholi**, Lectuer Computer, L. J. Polytechnic, Ahmedabad.
- **Prof. J. L. Vyas**, Lectuer Computer, L. J. Polytechnic, Ahmedabad.

Coordinator and Faculty Members from NITTTR Bhopal

- **Dr M A Rizvi**, Associate Professor, Department of Computer Engineering and Applications.
- **Dr R K Kapoor**, Associate Professor, Department of Computer Engineering Applications. .